EIW AF 3641

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PATENT
TH 2094 (US)
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	
Edward Paul Cernocky and Allen J. Lindfors	GROUP ART UNIT 3641
Serial No. 09/896,432	EXAMINER: H. A. Blackner
Filed June 29, 2001	August 13, 2004
METHOD AND APPARATUS FOR DETONATING AN EXPLOSIVE CHARGE	

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

SUBSTITUTE APPELLANT'S BRIEF

The following Substitute Appellant's Brief is on appeal of a final rejection of claims of the above-identified U.S. patent application, the final rejection contained in an Office action mailed on October 8, 2003, and a notice of appeal mailed by applicant on January 8, 2004. This brief is filed in triplicate. This Substitute Appellant's Brief is filed in response to a Notification of Non-Compliance with 37 CFR 1.192(c) mailed on July 13, 2004. The below amended brief addresses the issues raised by the Notification. No charge or fee should be required as a result of filing this Substitute Appellant's Brief, but if a fee is required, please charge to Shell Oil Company Deposit Account No. 19-1800. It is respectfully requested that the Board consider the following arguments and reverse the final rejection of claims 1-14 in the above-identified application.

REAL PARTY IN INTEREST

The invention of the present application is assigned to Shell Oil Company, which is the real party of interest in the present appeal.

RELATED APPEALS AND INTERFERENCES

Appellant, and appellant's legal representative, are not aware of any appeals or interferences that directly affect or could directly be affected by or have a bearing on the Board's decision in the present appeal.

STATUS OF THE CLAIMS

Claims 1-14 stand as finally rejected under 35 U.S.C. §103(a).

STATUS OF AMENDMENT

There are no amendments filed herewith or outstanding with respect to this application.

SUMMARY OF THE INVENTION

The present invention relates to a A detonation device for selectively perforating a tubular with a designated explosive charge located downhole in a well bore, said device including: the tubular; the designated explosive charge attached to the tubular; a wireless receiver; microprocessor and control means connected to said wireless receiver; an explosive bridge wire; high voltage supply means; and energy storage and trigger means, whereby a coded signal received by said wireless receiver is decoded by the micro processor and, if the code designates that the respective explosive charge is to be detonated, sends a signal to the trigger means which will supply high voltage to explosive bridge wire which will create sufficient energy to initiate detonation of the respective explosive charge and thereby perforating the tubular. In an embodiment of the invention, the explosive bridge wire includes: a circuit board having an aperture therein; and an electrical circuit formed on the board with a portion of the circuit overlying the aperture forming a bridge, the bridge having dimensions smaller than the rest of the

electrical circuit so that, upon application of power to the circuit, the bridge will flash vaporize causing detonation of the nearby explosive charge.

ISSUES

1. Whether claims1-5 and 7 are patentable under 35 U.S.C. §103(a) over Babour in view of Guerreri.
2. Whether claim 6 is patentable under 35 U.S.C. §103(a) over Guerreri in view of Neyer.
3. Whether claims 8-12 and 14 are patentable under 35 U.S.C. §103(a) over Babour in view of Abouav, and further in view of Guerreri.
4. Whether claim 13 is patentable under 35 U.S.C. §103(a) over Babour in view of Abouav, and further in view of Guerreri in further in view of Neyer

GROUPING OF CLAIMS

Claims 1-5, 7-12 and 14 stand together and claims 6 and 13 stand alone. Claims 6 and 13 differ from the remaining claims in that an explosive bridge wire is vaporized to cause the detonation of the explosive charge, and the explosive charge is located on a circuit board. This additional elements are nonobvious additions to the elements of claim 1and 8. These elements are not found in the references of record. Claim 6 stands alone because references over which claim 6 is rejected do not include any suggestion of a wellbore to be prefer orated.

ARGUMENTS

1. Rejection of claims 1-5 and 7 lacking in the combination of Babour and Guerreri et al. improper because all elements are not present in these references, and there is no suggestion to combine

Claims 1-5 and 7 stand as rejected over Babour et al. (US patent no. 5,467,823) in view of Guerreri et al. (US patent 4,884,506).

To form a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art to modify the references or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined)

must teach or suggest all the claim limitations. MPEP § 2142, citing *in re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The present rejections state as a motivation to combine the references, in particular, Babour et al. to form a *prima facie* basis for the rejection, "[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to employ Guerreri's remote detonation device in order to assemble a detonation device that can operate within an environment having high levels of extraneous electricity including stray ground currents, electromagnetic fields, and radio frequency energy."(final rejection, mailed Octoher 8, 2003, page 3) This is not a sufficient suggestion to combine the references because there is no evidence that a wellbore has high levels of extraneous electricity including stray ground currents, electromagnetic fields, and radio frequency energy. In fact, a wellbore is about as well grounded as a piece of metal can be. Further, if there were extraneous electrical signals, one of ordinary skill in the art might tend to favor a hard wired system such as the wire used to communicate with the shaped charges as suggested by Guerreri. This rational is closer to a teaching away than a suggestion to combine the references.

Even if combined, the element of perforation of the tubular with the designated explosive charge is not taught or suggested in the combined references. Thus a proper prima facie basis for the rejection is not provided. Babour et al. suggest a system for installing sensors in a cemented region around a wellbore, and then perforating the cement around the casing. Babour et al. uses a hard wire connection to control a detonation of shaped charges to perforate the cement without damaging the casing. The goal of Babour et al. is to provide communication to the monitor from the formation surrounding the wellbore through the cement. In FIG. 5 of Babour et al., a separate uncased wellbore is used to place the sensor in the formation, and then the cement is perforated to provide communication between the sensor and the formation. In neither embodiment is a tubular perforated by the remotely controlled shaped charge. For example, in col 3, lines 9-11, "the pressure gauge 14 remains isolated from the fluid flowing into the string 13 from the producing reservoir R2". Perforated casings are shown in the figures, but the invention of Babour et al. is to place a sensor outside of the casing, and then perforate the cement around the casing to provide communications between the sensor and the formation around the casing.

Guerreri et al. suggests a remote detonation system for detonation of explosive charges selectively. Guerreri et al.'s system is suggested for use in applications such as military applications where the charge is transported to a hazardous location by a remote controlled tractor, and then

detonated. It is not suggested that the remote detonation system of Guerreri et al. be used to perforate wellbores tubulars as in the present system.

2. Basis for rejection of claims 6 is lacking in the combination of Guerreri in view of Neyer because all elements are not present in these references, and there is no suggestion to combine the references.

The arguments above related to the lack of a suggestion to combine Guerreri with the other references of record are also applicable to the present rejection, and are not repeated.

Neyer suggests a shaped bridge slapper having a pair of spaced conductive lands on a substrate; a bridge member between the spaced conductive lands, the bridge member having a curved shape and a cavity herein, and a flyer layer extending over the bridge member. The present invention includes circuit board having an aperture therein; an electrical circuit formed on the board with a portion of the circuit overlying said aperture forming a bridge, the bridge having dimensions smaller than the rest of the electrical circuit so that, upon application of power to the circuit, the bridge will flash vaporize causing detonation of the nearby explosive charge. The invention of claim 6 detonates a charge by vaporization of the bridge, not the slapper mechanism of Neyer. This element is therefore lacking in the combination of Neyer and Guerreri.

Also lacking in the combination of Guerreri et al. and Neyer is any mention of perforation of a wellbore tubular.

3. Basis for rejection of claims 8-12 and 14 lacking in the combination of Babour in view of Abouav, and further in view of Guerreri because all elements are not present in these references, and there is no suggestion to combine the references.

Claims 8-12 and 14 stand as rejected over Babour et al. with Guerreri et al. and Abouav (US patent no. 5,090,321). Abouav suggests an actuator for use in conjunction with a detonator for blasting that includes, which on receiving input signals generates an output arm signal to arm a detonator, and then after a predetermined delay an output actuate signal to fire the detonator and an associated explosive charge. Arguments discussed above addressing the rejection of claims 1-5 and 7 are equally applicable to this rejection because Abouav does not add to Babour et al. and Buerreri the elements missing from the rejection of the claims. Nor does Abouav supply a suggestion to combine Guerreri and Babour.

4. Basis for rejection of claims 13 is lacking in the combination of Babour in view of Abouav, and further in view of Guerreri in further in view of Neyer because all elements are not present in these references, and there is no suggestion to combine the references.

The four references of this rejection do not contain elements of vaporization of the bridge as required by claim 13 (as discussed above with regard to rejection of claim 6), nor the perforation of the tubular with the designated explosive charge (as discussed with regard to rejection of claims 1-5 and 7 above). Further, as discussed above with regard to rejection of claims 1-5 and 7, there is no suggestion to combine Babour and Guerreri.

CONCLUSION

For the reasons set forth above, the applicants assert that the rejections made by the Examiner are improper. Applicants therefore request that the Board reverse the Examiner's rejections, and allowance of the claims is respectfully requested.

Respectfully submitted,

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Enclosure: Triplicate copies of Petition with appendix of claims

APPENDIX

Claims under Appeal

US 09/896,432

1. A detonation device for selectively perforating a tubular with a designated explosive charge located downhole in a well bore, said device comprising:

the tubular;

the designated explosive charge attached to the tubular;

a wireless receiver;

microprocessor and control means connected to said wireless receiver;

an explosive bridge wire;

high voltage supply means; and energy storage and trigger means, whereby a coded signal received by said wireless receiver is decoded by the micro processor and, if the code designates that the respective explosive charge is to be detonated, sends a signal to the trigger means which will supply high voltage to explosive bridge wire which will create sufficient energy to initiate detonation of the respective explosive charge and thereby perforating the tubular.

2. The detonation device according to claim 1, wherein said coded signal allows selective detonation of a plurality of explosive charges individually.

3. The detonation device according to claim 1, wherein said coded signal allows selective detonation of a plurality of explosive charges in sequence.

4. The detonation device according to claim 1, wherein said coded signal allows selective detonation of a plurality of explosive charges in any desired pattern.

5. The detonation device according to claim 1 wherein the wireless signal does not transmit the power to initiate detonation of the explosive charge thereby reducing the risk of accidental detonation of the explosive charge.

6. The detonation device according to claim 1 wherein said explosive bridge wire comprises:

circuit board having an aperture therein;

an electrical circuit formed on said board with a portion of the circuit overlying said aperture forming a bridge, said bridge having dimensions smaller than the rest of the electrical circuit so that, upon application of power to the circuit, the bridge will flash vaporize causing detonation of the nearby explosive charge.

7. The detonation device according to claim 1 wherein said microprocessor includes digital signal processing logic.

8. A method for selectively perforating a tubular with a designated explosive charge located downhole in a well bore, comprising the steps of:

attaching the explosive charge to the tubular;

providing a detonating device having a wireless receiver, microprocessor and control means connected to said wireless receiver, at least one explosive bridge wire, high voltage supply means, and energy storage and trigger means; and

transmitting a coded signal to said wireless receiver to be decoded by the microprocessor and, if the code designates that the respective explosive charge is to be detonated, sends a signal to the trigger means which supplies high voltage to the explosive bridge wire causing it to

substantially instantly vaporize creating sufficient energy to initiate detonation of the respective explosive charge and thereby perforating the tubular.

9. The method according to claim 8, wherein said coded signal allows selective detonation of a plurality of explosive charges individually.

10. The method according to claim 8, wherein said coded signal allows selective detonation of a plurality of explosive charges in sequence.

11. The method according to claim 8, wherein said coded signal allows selective detonation of a plurality of explosive charges in any desired pattern.

12. The method according to claim 8 wherein the coded signal does not transmit the power to initiate detonation of the explosive charge thereby reducing the risk of accidental detonation of the explosive charge.

13. The method according to claim 8 wherein said explosive bridge wire comprises:

circuit board having an aperture therein;

an electrical circuit formed on said circuit board with a portion of the electrical circuit overlying said aperture forming a bridge, said bridge having dimensions smaller than the rest of the electrical circuit so that, upon application of power to the electrical circuit, the bridge will flash vaporize causing detonation of the nearby explosive charge.

14. The method according to claim 8 wherein said microprocessor includes digital signal processing logic.